Hungarian Vowel Harmony

Anna Dunbar-Hester

In this paper I will be discussing the Hungarian Vowel Harmony System. First I will give a brief discussion of the Hungarian Suffix System, then introduce the Vowel Harmony System. Next I will explain the field research that I have done, after which I will make conclusions about the rules of harmony in Hungarian and formalize these rules through Generative Phonology and Optimality Theory.

I. The Hungarian Suffixation System.

1. The Hungarian Vowels

Hungarian has an inventory of 14 vowels. Following precedent set by Robert Vago (1974), I will use native orthography throughout this paper for ease of interpreting data. The vowel system is as follows:

	FRONT				BACK			
	UNROUNDED		ROUNDED		UNROUNDED		ROUNDED	
	Short	Long	Short	Long	(Short)	Long	Short	Long
HIGH	i	í	ü	ű			u	ú
MID		é	ö	ő		á	o	ó
LOW	e				á		a	

Because the vowel system is so complex, I will also include here a feature analysis to help break down the above information:

Native Orthography	Phonetic Representation	Back	Round	High	Low	Long
i	i	-	-	+	-	-
í	i:	-	-	+	-	+
e	ɛ	-	-	-	+	-
é	e	-	-	+	-	-
a	a	+	-	-	+	-
á	ɔ	+	+	-	+	-
o	o	+	+	-	-	-
ó	o:	+	+	-	-	+
ö	ø	-	+	-	-	-
ő	ø:	-	+	-	-	+
u	u	+	+	+	-	-
ú	u:	+	+	+	-	+
ü	y	-	+	+	-	-
ű	y:	-	+	+	-	+

2. Suffixation

Hungarian employs a large system of suffixes, which are heavily used to form words, each suffix having a single morphological function. The following examples are taken from Siptár and Törkenczy (2000) because they are great at demonstrating the wide range of suffix use available in Hungarian.

a. barát –sag –os –abb –an
friend –ship adj. comp. adv.
'in a more friendly manner'

b. ház –as –u –andó –k –nak
house adj. verb participle pl. dat.
'for those intending to get married'

c. te –het –ség –es –ebb –ek –et
do –able –ness adj. comp. pl. acc.
'the more talented ones' (acc.)

3. The Case System

A number of common suffixes belong to the case group, which I have included here because they are necessary for understanding Vowel Harmony. This list is derived from two sources, one of Siptár and Törkenczy (2000) and the second from Törkenczy (1997), in attempts to provide the most complete list.

Case	Marker	Approximate Meaning
Nominative	Ø	(subject)
Accusative	-t	(object)
Dative	-nak/-nek	to, for
Instrumental	-val/-vel	with
Illative	-ba/-be	into
Sublative	-ra/-re	onto
Allative	-hoz/-hez/-höz	to
Inessive	-ban/-ben	in
Superessive	-on/-en/-ön	on
Adessive	-nál/-nél	at
Elative	-ból/-ből	out of
Delative	-ról/-ről	of, about, from top of
Ablative	-tól/-től	from
Causal/Final	-ért	for
Translative	-vá/-vé	(turn) into
Essive/Formal	ként, képp, ul/ül	similar to something
Terminative	-ig	up to
Associative	-ostul/-estül/-östül	together with
Temporal	-kor	at
Distributive	-onta/-ente/-önte	repeatedly, every

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Note that some vowels sometimes have alternates and some do not. The vowel choices fall into the following sets: 1) a/e 2) o/e/ö 3) á/é 4) ó/ő 5) é 6) i 7) o 8) u/ü.

<u>II. Hungarian Vowel Harmony.</u>

1. Vowel Harmony Types

Polgardi (1998) says "Harmony is a process whereby some segmental feature associates to all segments of a certain type in a specific domain." Hungarian contains two kinds of vowel harmony, one applying to roundness and the second to backness. Roundness Harmony in Hungarian is quite simple and therefore many linguists do not spend too much time studying it or debating its driving forces. My research is also not going to involve Roundness Harmony. The second type of Vowel Harmony employed in Hungarian is Backness Harmony, which is much more complicated than Roundness Harmony and therefore more controversial. I will do my best to present the basic arguments regarding Backness Harmony, and present the case that is most satisfying and complete in my opinion, that of Miklos Törkenczy and Péter Siptár, in their book entitled <u>The Phonology of Hungarian</u>.

2. Outline of Backness Harmony

Now I will give a basic outline of Backness Harmony to aide the understanding of upcoming issues. Backness Harmony works on the principles of keeping vowels of one type or another (front or back) within an individual word. Hungarians pride themselves on having a harmonic language because it essentially makes the words prettier to listen to and easier to pronounce. Native, non-compound word roots in Hungarian are either of the front or back type. A front word root has only front vowels or front and neutral vowels only. A back word root has only back vowels. Sometimes there are mixed vowel root words though, when a word root has both neutral and back vowels, and that is where real problems begin. We should expect that back and neutral vowels yield a back root (isn't that what neutral means?), but this is not the case.

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3. Neutral Vowels

Neutral vowels are generally considered to be *e*, *é*, *í*, and *i*, although there is debate over *e*.

Neutral vowels are sometimes referred to as "transparent" vowels, because they appear to be invisible in the harmonizing process. Sometimes when multiple neutral vowels occur in succession they do become players in the harmonization, and that is when they are no longer transparent, but rather opaque. (This occurs when they are the last two vowels in a word root.) I will continue to use 'neutral' and not 'transparent,' but later on there will be more discussion of the opaque instances, as they are a major issue.

There also seem to be degrees of neutrality, as Ringen and Kontra (1989) suggest and Törkenczy and Siptár (2000) expand upon, where high front unrounded vowels are considered the most neutral (*i*, *í*), the mid front unrounded vowel is less neutral (*é*), and the low front unrounded vowel is the least neutral (*e*). The motivations for classifying different degrees of neutrality will become more apparent when we examine mixed word roots later on, but the basic justifications are as follows. The high unrounded vowels *i* and *í* never alternate harmonically, because there are no Hungarian back counterparts to these vowels, which makes *i* and *í* the most harmonic. In suffixes, *e* always alternates with either *a* or *o/ö*, and *é* either has no alternate or alternates with *á*. So, *é* is less harmonic than *i* and *í* because it sometimes alternates, and *e* is the least harmonic because it always alternates. As further evidence that *e* is the least harmonic, there are no back harmonic neutral vowel roots that contain *e*, and mixed vowel roots that contain *e* in the last syllable are the most unstable with respect to selecting a suffix vowel (Kenesei, Vago, Fenyvesi, 1998).

4. Simple Applications

To demonstrate vowel harmony, I am going to provide a few simple examples. Notice in the case chart in 1.3 that some cases have alternate forms, i.e. –val/vel. The correct form is chosen based on whether the vowels in the root of the word make the root front harmonic or back harmonic. If a word contains front harmonic vowels (ö, ő, ü, ű), it is considered a front-harmonic root and governs a front-vowel suffix. Note that if a word has a prefix, this does not effect the harmony of the root. An internal word boundary is present in this case. Note also that a word with only neutral vowels acts as front-

harmonic. I posit that this occurs because neutral vowels are technically front vowels, even though they are not front-harmonic. A group of exception words of this type will be addressed later.

Front Harmony		Back Harmony	
gyümölcs → gyümölcsvel	with the fruit	kutya → kutyával	with the dog
üveg → üvegből	out of the bottle	lámpa → lámpából	out of the lamp
nő → nőnél	at the woman	nap → napnál	at the day
Péter → Péternek	for Peter	falu → falunak	for the village
kenyér → kenyérben	in the bread	paradicsom → paradicsomban	in the tomato

5. Complications

As I stated before, sometimes neutral vowels behave in an opaque manner. Törkenczy and Siptár (2000) have developed a model for laying out exactly the possible behaviors of mixed stems are, which I will produce an expanded version of shortly. I am in favor of this analysis because of its ability to describe all the complex data in one concise chart, which gives us insight into the system of when different suffixes are chosen. I will now summarize their analysis of mixed root behavior.

A mixed root is categorized by the last two vowels in the stem. (Remember that to be a mixed root the root must contain back and neutral vowels.) First, we have a category of roots that have a back vowel in their penultimate vowel position and a neutral vowel in the last vowel position. Cases exist where, regardless of which neutral vowel is chosen, the only vowel that is chosen for the suffix is back. If the neutral vowel is e or é however, there are stems that govern either front or back vowels in the suffix, but either is fine. These are called vacillating endings. Some roots only take a front vowel suffix, and this is referred to as a disharmonic suffix. This only occurs when e is in the neutral vowel position.

The second category of roots has a neutral vowel in the penultimate vowel position and another neutral vowel in the final vowel position, giving two neutral vowels in a row. These have long been known to cause problems, for example, *analizis-nek, november-nek*. In these roots, the vowels apparently do not act fully neutral. There are some cases in which they seem to gain opaque status and create the power for governing a front vowel suffix, and other cases in which the stems are again vacillating. But we have no cases thus far of two neutral vowels at the end of a root which govern only a

back vowel suffix, indicating that the back vowel proceeding the neutral vowel has somehow had its harmonizing power blocked or at least reduced.

At this point, all this information will be summarized in two charts. The second chart, mixed roots, is especially useful because it helps us to see which suffix endings are not known to ever be chosen in mixed root situations (the shaded cells). It also breaks down the final vowel position into the different categories of high, mid, and low neutral vowels. The first table shows simple cases where the root is not mixed, for comparison.

Simple Roots

penultimate V	final V	back vowel chosen (vacillating suffixes)	front vowel chosen
back	back	zacskó-nak	
neutral	back	citrom-nak	
front	front		függöny-nek
front	neutral		nővér-nek
neutral	front		rendőr-nek

Complex Roots

penultimate V	final V	back vowel chosen (neutral vowels completely transparent)	vacillating suffixes	disharmonic vowel chosen (front vowel)
back	í, i	papir-nak		
back	é	rostély-nak		
back	e	haver-nak		
neutral	í, i		konkrét-nak/nek	
neutral	é		dzungel-nak/nek	kódex-nek
neutral	e		analízis-nak/nek	
			matiné-nak/nek	
				oxigén-nek
				november-nek

6. Vacillating Suffixes

As previously stated, some word roots govern both front and back suffix endings, even for the same speaker. (Not necessarily all vacillating roots are vacillating for any individual, but there is evidence that the vacillation can occur within one speaker's grammar.) Apparently, this vacillation is not independent of environment, as discussed by Törkenczy and Siptar (2000). They cite work by Kontra, Ringen, and Stemberger that examined the frequency of vacillating endings being dependent of context. They used the example of *pulóver* (sweatshirt) in the contrasting environments *ezzel a pulóverrel* (with this sweatshirt) and *azzal a pulóverral* (with that sweatshirt). The finding that the suffix choice often

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reflected the distant-harmony of the context is revealing. This is strong evidence that vowel-harmony is not purely a phonological process, but probably also heavily influenced by morphology.

7. Monosyllabic Disharmonics

In Hungarian there exist a large number of monosyllabic words with only a neutral vowel. These words take front-vowel suffixes as expected because neutral vowels are front vowels, even if they are not front-harmonic. However, there exists a set group of fifty or sixty words of this type, which only allow a back vowel suffix.

governing front vowels: governing back vowels:
kép → képnél   at the picture   híd → hídnál   at the bridge
víz → víznél   at the water   cél → célnál   (at) aim

Through the years many attempts have been made to explain this, one of the most common being that of Vago (1974). He suggests that the best way of accounting for this set of data is to apply an abstract back vowel at the underlying representation which then correctly conditions back vowel harmony, and later a rule of absolute neutralization converts the back root vowels to front vowels. This analysis is declared unsuitable by Phelps (1978), Jensen (1978), and Ringen (1978), saying that there is no justification for this conclusion. Many argue that this solution is too shortsighted, because there is no way of predicting when this abstract vowel should exist except for when we want it to explain this outcome. I, however, agree that some form of morphological marker does exist and explains this data set, partly because I am convinced of morphological influences being involved in vowel harmony and also because there seems to be historical justification for doing so. Adrienn Mizsei (personal communication) asserts that the cause of this 'odd-fifty' is a vowel that governed back harmony but has disappeared from the Hungarian vowel inventory. Even though the vowel has disappeared, it is still honored by marking in the lexicon that those words govern back-vowel suffixes.

1. Introduction and Hypothesis

My research is a continuation of the above mentioned conclusions of Törkenczy and Siptár. My work is structured around their rules of mixed-vowel roots because I am interesting in testing their conclusions. My hypothesis is that my data will follow the rules of the chart. My data will either support our current understanding of the suffixation process or challenge our knowledge and encourage a different approach.

2. Process

To test my hypothesis, I devised a survey to distribute to forty University-aged Hungarian students in Budapest and Miskolc. I developed the survey according to precedent set by Catherine Ringen and K. David Harrison. The survey (see appendix A) consisted of a list of invented new words in Hungarian, following Hungarian word structure and alphabet. The subjects were asked to choose the best-sounding suffix for each new word. There were 42 new words on the survey, each repeated 3 times with different cases each time. The 3 cases chosen were dative (-nak/nek), elative (-ból/ből), and adessive (-nál/nél). These were chosen because they have different alternate vowels. The subject saw each word three times to test whether or not they chose the same (front vs. back) suffix each time.

The words were chosen to follow a specific pattern of vowel sequences. For each of the eight types of penultimate and final vowel combinations (back *i*, back *í*, back *e*, back *é*, neutral *i*, neutral *í*, neutral *é*, neutral *e*), four words were developed. The four words included one bisyllabic word with the last syllable open (no coda), one trisyllabic word with the last syllable open, one bisyllabic word with the last syllable closed, and one trisyllabic word with the last syllable closed. No detailed control of the consonants was made, although I did my best to keep them mixed and not to put the same types of consonants in the same positions. I did avoid use of *j* because of semi-vowel complications. Also, the words do contain a mix of consonant clusters and single consonants, to try to keep consonants at a minimal influence. No further consonant controls were enforced because it is simply out of the scope of this experiment. The list of words contains ten control words, which contain only front or only back

vowels. These were included to make sure the subjects understood their task. The version of the survey with the instructions in English is attached.

The words have all been verified by two native speakers to include no real Hungarian words and no words that are very similar to any Hungarian words, including slang. The words were judged to be Hungarian-like; authentic without being authentic.

IV. More on Vowels

The next step in my analysis of will be to construct a generative model, and then I will use the framework of Optimality Theory to present the constraints that exist in Hungarian Vowel Harmony. This way we will be able to examine the harmonization from two different perspectives. When this has been accomplished I will present a loose interpretation of the results of my empirical study and finish by making further conclusions about the nature of Vowel Harmonization in Hungarian. Before I continue though, I first want to add a little more detail to our knowledge of the Hungarian Vowel System. It is necessary to examine the features of vowels to correctly determine the process in which vowels harmonize, so I am repeating the feature system here.

Native Orthography	Phonetic Representation	Back	Round	High	Low	Long
i	i	-	-	+	-	-
í	i:	-	-	+	-	+
e	ε	-	-	-	-	-
é	e	-	-	+	-	+
a	a	+	-	-	+	-
á	ɔ	+	-	-	+	+
o	o	+	+	-	-	-
ó	o:	+	+	-	-	+
ö	œ	-	+	-	-	-
ő	œ:	-	+	-	-	+
u	u	+	+	+	-	-
ú	u:	+	+	+	-	+
ü	y	-	+	+	-	-
ű	y:	-	+	+	-	+

The feature *long* has been included in this chart but needs some clarification. First of all, it does not change the quality of the vowel but rather +long takes two time units. Secondly, there is no evidence of

vowel length affecting Vowel Harmony in Hungarian, but it has been included in the feature chart since it is the only contrastive feature between some vowels.

Looking at this chart, some patterns appear. First, all of the vowels we have been calling neutral are [-back] and [-round]. All of the back vowels are [+round] except for á, and all front vowels are [-low] except for e. All front harmonic vowels are [+round] and [-low]. Apparently, with the exception of á, all harmonic vowels are [+round] except for á, and all front vowels are [-low] except for e. All front harmonic vowels are [+round]. There may be motivation to declare á underlyingly [+round] so that we may say all harmonic vowels are round, especially considering the unbalanced back vowels, meaning all back vowels are round except á, knowing that harmony vowel systems prefer symmetry.

V. Generative Phonology

Here I will show the process of determining what the rules are that govern Hungarian Vowel Harmony. First, I will start with the simple cases, in which the word root has only front harmonic vowels, and then when a word has only back harmonic vowels. For instance, *gyümölcs* (fruit) has two front harmonic vowels, and should take a front vowel alternation suffix. The suffix –*ban/ben* is specified –long, -high, and +low, but has no specification for backness until this spreads from the root word to the suffix.

gyümölcs + ben
-b -b   (-b)

(Parenthesis indicate no backness specification at underlying representation.) The same will occur for *nő* (woman) when we use the suffix –*nak/nek*, which specifies –long, -high, +low, but nothing for backness. The same works when the root has only [+back] features, as in *kutya* (dog).

nő + nek
-b (-b)

kutya + val
+b +b   (+b)

Before I get any further, I feel it is necessary to add a bit about why I am feature filling as opposed to feature changing. As I stated above, when *nő* took a suffix, the vowel in –nak/nek was specified for

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—long, -high, and +low, but had no specification for backness. This creates a feature-filling environment, where the front harmonic vowel spreads its –back specification to -n_k, leaving it –nek. Why didn't –nak/nek start out with a specification for backness and then have its backness feature changed by the harmonization process? Some do consider –nek to be the underlying form of the –nak/nek suffix. The motivation for this is a case when the suffix form of –nak/nek acts as a word root, as in *nekem* (for me). *Nakam is ungrammatical. This at first seems to be sufficient justification, however, as Reiss (2002) points out, the argument quickly falls apart. Although the suffix –ről/ről is related to *rólam* (at me), the –ból/ból suffix is not positively related to *belőlem* (from in me), and more convincingly, the –en/on/ön suffix does not phonetically match the case root in *rajtam* (on me). Therefore, I conclude that the case suffixes and case roots are two lexically independent entries, and that the case suffixes are underspecified for backness.

Now some examples with neutral vowels. First a front harmonic word root, meaning it only contains front harmonic and neutral vowels. The word is *üveg* (bottle), the first vowel is front harmonic and the second is neutral, but also a front vowel. The question arises of whether or not to specify the *e* at the underlying level, because it appears to govern the correct suffix alternation, a front vowel, either way:

```
üveg + ben          üveg + ben
 |  \  /              |   \ /
-b  –b                -b(   )
      (-b)                   (-b)
```

Now let's try a mixed root, one that has both back and neutral vowels, say *boli* (pen). Again, the first example has the neutral vowel specified [-back] and the second example has the neutral vowel without a backness specification.

```
*boli + ben          boli + ban
 |  \  /              |   \ /
+b  -b                +b(   )
      (-b)                   (+b)
```

This demonstrates that if we specify the neutral vowel in the underlying representation, the incorrect suffix choice will be chosen because the wrong vowel will spread, giving justification for leaving unrounded front vowels (neutral vowels) underspecified for backness at their underlying representation.

The next examples are loan words, *dentális*, *aktív*, and *illusztris*, (dental, active, and illustrious), for which Ringen (1989) found that one hundred percent of those surveyed chose a [+back] suffix, which gives my analysis further evidence that the neutral vowels should be left underspecified.

```
dentális + nạk          aktív + nạk          illusztris + nạk
 |  \---               | \---                        | \---
( ) +b ( )  (+b)       +b ( )  (+b)         ( ) +b ( ) (+b)
```

Ringen shows that for disharmonic loan words, the right-most harmonic vowel governs the suffix vowel choice. In one study she found that word roots in which the first vowel is front harmonic and the second vowel is back harmonic were found to govern a back vowel suffix one hundred percent of the time, whereas a word root in which the first vowel is back harmonic and the second vowel is front harmonic was found to govern a front vowel suffix for ninety-eight percent of the subjects. The words are *büró* and *soför* (bureau, chauffeur) and are diagrammed below. This demonstrates that front rounded vowels do not lose their harmony-governing powers when in a word with back vowels, and that the right-most harmonic vowel is the one whose features spread.

```
büró + nạk              soför + nẹk
 | | \                   | | \
-b +b  (+b)             +b -b  (-b)
```

Through this point, we can assume the following about the underlying representations of Hungarian words:

1. *á* is underlyingly +round
2. –round vowels have no backness specification
3. Suffixes for which there is an alternating vowel have no backness or roundness specification.

The generalizations of grammar that we have so far are:

1. Backness spreads from the right-most specified +round vowel in the word root to vowels that have no roundness specification. (This will prevent spreading onto neutral vowels in the word root.)
2. Any underspecified root vowels will default to [-back].
3. Backness spreads from the right-most specified vowel in the word root to vowels that have no roundness specification.
4. All vowels not specified for roundness default to –round.
5. *á* becomes –round.

Next, I will introduce some more complicated data. The disharmonic suffix group can be accounted for a little messily, but successfully. The loan-word *kódex*, for example, only takes a front-

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vowel suffix. I assume that there is a floating [-back] feature on the *e* in the morphology as [-back], so that it is specified in the underlying representation before the phonological processes begin. There is no way to predict this sub-class of words, but it may be helpful to remember that they are loan-words and maybe something just went a little off-course in the assimilation process. Kontra and Ringen (1986) also believe that loan words sometimes follow different rules.

```
*kódex + nak            kódex + nek
+b ( )                  +b -b
+b ( )  (+b)            +b -b  (-b)
```

Next I want to consider vacillating suffixes, such as *konkrét* and *dzungel* (concrete and jungle). It is acceptable in this case to choose either a front or back vowel suffix. I propose that there are two lexical entries for these words for some speakers, one containing the exceptional morphological specification of [-back] on the neutral vowels and one without the specification, which will behave according to expectations. Note that this type of words only occurs when there is an *e* or an *é* in the last vowel position.

```
konkrét + nak           konkrét + nek
+b ( )                  +b -b
+b ( )  (+b)            +b -b  (-b)

dzungel + nak           dzungel + nek
+b ( )                  +b -b
+b ( )  (+b)            +b -b  (-b)
```

As of yet we have not approached the words with two neutral vowels in the last two positions, but that is next. Let's start by looking at some examples. The words *oxigén* and *november* (oxygen and November) both have one back vowel and then two neutral vowels. Based on what we have seen so far, the following is to be expected:

```
*oxigén + nak           *november + nak
+b ( )( )               +b ( )( )
+b ( )( )  (+b)         +b ( )( )  (+b)
```

However, these are both ungrammatical. Apparently, the two non-specified neutral vowel positions have prevented the spreading of the [+back] feature. This is what is referred to as an opaque neutral vowel situation. To solve this, I suggest adding a rule about feature spreading in our grammar that states:

Backness cannot spread over more than two vowel positions.

So, after applying this rule, we are left with still no backness specification in the suffix:

oxigén + n_k
+b ( )( ) ( )

november + n_k
+b ( )( ) ( )

Now we apply rule 2, which allows us to put in the default features of [-back] in the word root, giving us:

oxigén + n_k
+b (-b) (-b) ( )

november + n_k
+b (-b) (-b) ( )

And now we apply rule three, 'backness spreads from the right-most specified vowel in the word root to vowels that have no roundness specification.'

oxigén + n_k
+b (-b) (-b) (-b)

november + n_k
+b (-b) (-b) (-b)

Although there is never a word root structure of this form that will only govern a back vowel suffix, there are many words that are vacillating in their suffix choice. This is a case where the [-round] [-back] [+low] *e* starts to show its strength, as it leans towards being a harmonic front vowel instead of a neutral vowel. If the word has a back vowel then any neutral vowel and then an *e*, as in the word *operett* (operetta), then a back vowel suffix is never acceptable. But if in place of an *e* there is an *é*, a back vowel *may* be acceptable (*matiné*, matinee) and if instead there is an *i* or *í* a back vowel suffix is *always* acceptable, in addition to the front vowel suffix (*analízis* and *aszpirin*, analysis and aspirin).

*operett + nak
+b ( )( ) (+b)

operett + nek
+b (-b)(-b)(-b)

matiné + nak
+b ( )( )(+b)

matiné + nek
+b (-b)(-b) (-b)

analízis + nak
+b +b( )( )(+b)

analízis + nek
+b (-b)(-b) (-b)

aszpirin + nak
+b ( )( ) (+b)

aszpirin + nek
+b(-b)(-b)(-b) (-b)

I suggest making a lexical entry be responsible for this variation, so that the words which accept both [-back] and [+back] suffixes have two lexical entries, one irregular with the final vowel é being marked [+back] so that we attain the vacillating results that are grammatically correct. Therefore, matiné has two lexical entries:

matiné   &   matiné[-b]

+b( )( )   +b ( ) -b

To account for the 'odd-fifty', I will also use the floating backness feature as a lexical irregularity to predict the correct outcome. Therefore, híd would look like this:

híd[+b] -nak
| | |
-b +b (+b)

    In summary, the generalizations are as follows:

Underlying Representation:

1. á is underlyingly +round

2. –round vowels have no backness specification

3. Suffixes for which there is an alternating vowel have no backness or roundness specification.

Generative Grammar:

1. Backness spreads from the right-most specified <u>+round</u> vowel in the word root to vowels that have no roundness specification. (This will prevent spreading onto neutral vowels in the word root.) Backness cannot spread over more than two vowel positions.

2. Any underspecified root vowels will default to [-back].

3. Backness spreads from the right-most specified vowel in the word root to vowels that have no roundness specification.

4. All vowels not specified for roundness default to –round.

5. á becomes –round.

The reason for having two generalizations in regards to spreading is that Hungarian prefers to spread round vowels only (with the exception of á). However, since that spreading feature is only strong enough to spread two vowel places, sometimes it doesn't successfully reach the suffix vowel. In this case, the neutral vowels take their default [-back] specification and are then capable of spreading

backness, even though they aren't round. After this, all vowels are fully specified and the *á* loses its +round feature, which it has for harmonizing, and becomes its surface representation self, -round.

<u>VI. Optimality Theory</u>

Hungarian Vowel Harmony fits fairly well into the framework of Optimality Theory. My analysis requires all neutral vowels ([-back], [-round]) to be unspecified as to backness at the input level, and I agree with Ringen and Vago (1998) that underspecification seems crucial to an OT analysis in a vowel harmony language such as Hungarian.

First, a key to understanding the shorthand of the underspecified vowels in the OT model:

Á : á/é : [+long] [-round] [-high]

A : a/e : [-long] [-high] [+low]

O : o/e/(ö) : [-long] [-high] & {[+back] [+round] [-low]} OR {[-back] [-round] [+low]} (OR {[-back] [+round] [-low]}0

Ó : ó/ö : [+long] [+round] [-high] [-low]

I : i : [-long] [-round] [+high] [-low]

Í : í/í : [+long] [-round] [+high] [-low]

E: e : [-long] [-round] [-high] [+low]

É : é : [+long] [-round] [-high] [-low]

Although all three variations for O are given above, rounding variations are out of the scope of this analysis, and I will not be addressing cases that involve rounding. Also, the variations for O are tedious, but because of the nature of the vowel system in Hungarian, there is no neat way around it. Also note that for I, Í, E, and É, there is only one variation possible, because *i, í, e,* and *é* do not have [+back] counterparts, which is part of the reason they are neutral. By leaving them unspecified at the input level we allow the harmony process to occur naturally, which is the desired effect.

Constraints

My analysis uses the following five constraints:

1. ALIGN-BK

No vowel intervenes between the right edge of a specified [back] and the right edge of the prosodic word.

2. FAITH_inventory

No vowel may be outside of the inventory of Hungarian vowels.

3. FAITH_root

Corresponding input and output root vowels may not have *different* specifications. ([Øback] →
[αback] is okay, [αback] → [βback] is not okay.)

4. FAITH_affix

Corresponding input and output affix vowels must not have *different* specifications.

5. *[αback] [βback]

Don't have vowels in adjacent syllables have different backness specifications.

Following are many of the same examples from the Generative Phonology account. The words are presented in roughly the same patterns to see how this analysis handles the same problems we've seen before.

First, a straightforward example where all the vowels in the word agree in backness.

gyümölcsbAn	ALIGN-BK	FAITH_root	FAITH_inv	FAITH_affix	*[αBK] [βBK]
gyümölcsban	*!				*
☞ gyümölcsben					
gyümyicsban		*!	*	*	*
gyumölcsben			*!	*	*

At this point, since the correct outcome, *gyümölcsben* does not violate any of the constraints, it is not clear whether any of the constraints outrank one another. We will have to see a few more examples.

This next one is a simple case of a mixed root containing a back vowel and then a neutral vowel. It appears to support a move towards ranking the *[αBK] [βBK] constraint lower than the rest, since it is the only one the optimal choice violates.

bolibAn	ALIGN-BK	FAITH_root	FAITH_inv	FAITH_affix	*[αBK] [βBK]
☞ boliban					**
bolæban			*!	*	**
boliben	*!		*	*	*
baliban			*!	*	**

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The next example is a loan word with only one harmonic vowel. This is another good example of why underspecifying neutral vowels is handy, because this word has two front vowels and only one back vowel, but by underspecifying the front neutral vowels they don't spread.

dEntálIsnEk	ALIGN-BK	FAITH_root	FAITH_inv	FAITH_affix	*[αBK][βBK]
dentálisnák			*!		***
dintalisnak		*!	*!		***
dentélisnek			*!		***
dentálisnek				*!	**
☞ dentálisnek					***

In the last two examples, *[αBK][βBK] has been the only constraint that the optimal output violated, so we are going to keep it the lowest ranked constraint. Next, I am going to look at *kódex*. This is a word that feeds Ringen's classification of *e* as front harmonic, but instead of following suit, I am going to leave the *e* unspecified and call upon another of her and Vago's techniques, which is to assign a floating [-back] feature to the root *e*, which will not be phonetically realized except in the suffixation process.

kódE[-b]xbAn	ALIGN-BK	FAITH_root	FAITH_inv	FAITH_affix	*[αBK][βBK]
☞ kódexben					*
kódexban		*!			*
kódaxban			*!		*
kódexbin				*!	*

The reason I do not also choose to make *e* neutral is for the times when it behaves as a regular neutral vowel, as in *haver* and *maszek* (friend, self-employed). Since *maszek* has the same vowel pattern and governs the same output (back vowel suffix), only the tableau for *haver* is below.

havErnAk	ALIGN-BK	FAITH_root	FAITH_inv	FAITH_affix	*[αBK][βBK]
havernek		*!			*
☞ havernak					**
havernuk				*!	**
havarnak			*!		**

Ringen and Vago proposed the floating feature to account for the "odd fifty," the group of monosyllabic, single-neutral-vowel-containing words that take a back suffix instead of the common and logical front suffix. I will also adopt the floating feature to account for these words, as seen here with *víz* and *híd*.

víznAk	ALIGN-BK	FAITH$_{root}$	FAITH$_{inv}$	FAITH$_{affix}$	*[αBK] [βBK]
☞ víznek					*!
víznak			*!		
váznak		*!			*!
víznik				*!	*!

híd$^{[+b]}$dnAk	ALIGN-BK	FAITH$_{root}$	FAITH$_{inv}$	FAITH$_{affix}$	*[αBK] [βBK]
hídnek	*!				
☞ hídnak					*
hádnak			*!		
hídnék				*!	

To account for cases in which two neutral vowels cause a front vowel suffix:

Since all words with two neutral vowels in the last two vowel positions govern front vowel suffixes, even though some (but not all) also govern back vowel suffixes, I am prepared to make that the norm, and say that back vowel suffixes are the exception and are due to irregularity in the lexicon. I propose the following constraint be added:

*NEUT

*{[-back] [-round]} {[-back] {[+back]}, meaning that it is marked for a back vowel to follow two neutral vowels. (*NEUT will not work if there are additional floating vowel markers.)

This will work for all words that contain a neutral penultimate vowel and a neutral last vowel, including *analízis, matiné, oxigén,* and *november.* Since *analízis* and *matiné* are actually vacillators, there must be a morphological explanation. Apparently, if the penultimate vowel is neutral and the last vowel is *i* or *í*, the lexicon will always have two entries, one of which will have a floating [+back] vowel feature which will then cause the correct surface representation by means of the constraints. It would be nice to take

this out of the morphology and put it into the constraints, but because the nature of OT is to choose the single optimal output, I hold that the vacillation is morphologically driven. Also, since we know that environmental factors help determine which vacillating suffix is chosen, we have further evidence that it is being controlled in the lexicon.

My final constraint ranking is:

*NEUT >> FAITH$_{root}$, FAITH$_{inv}$, FAITH$_{affix}$ >> ALIGN-BK >> *[αback] [βback]

Now I will give a few more example tableaux to demonstrate the constraints, and two cases where the lexicon drives the suffix choice.

rostÉlynAk	*NEUT	FAITH$_{root}$	FAITH$_{inv}$	FAITH$_{affix}$	ALIGN-BK	*[αBK] [βBK]
rostélynek				*!		*
restélynek		*!				
☞ rostélynak						**
rostelynuk			*!		*	**

analízIsnAk	*NEUT	FAITH$_{root}$	FAITH$_{inv}$	FAITH$_{affix}$	ALIGN-BK	*[αBK] [βBK]
analízisnak	*!					**
☞ analízisnek					*	*
analízisnik				*!	*	**
analízasnak			*!		**	**

novEmbErnAk	*NEUT	FAITH$_{root}$	FAITH$_{inv}$	FAITH$_{affix}$	ALIGN-BK	*[αBK] [βBK]
☞ novembernek					*	*
nævembernek			*!		*	*
novembernak		*!			**	**
novembernék				*!	*	*

Here I will present the data from the surveys. More detailed data is available in Appendix B.

dzungElnAk	*NEUT	FAITH$_{root}$	FAITH$_{inv}$	FAITH$_{affix}$	ALIGN-BK	*[αBK] [βBK]
dzungElnAk						
dzungelnek						
☞ dzungelnak						
dzungalnak		*!			*	**
dzungelnæk			*!		*	*

analízi[+bk]nAk	*NEUT	FAITH$_{root}$	FAITH$_{inv}$	FAITH$_{affix}$	ALIGN-BK	*[αBK] [βBK]
analízisnek					*!	**
☞ analízisnak					*	*
enelízisnek		**!			*	**
analízisnik				*!	*	

cE[+bk]nAk	*NEUT	FAITH$_{root}$	FAITH$_{inv}$	FAITH$_{affix}$	ALIGN-BK	*[αBK] [βBK]
☞ célnak					*	*
celnek		*!			*	*
célnek					*!	
célék				*!	*	

Front Control	Received Front Suffix	
	94%	

Back Control	Received Back Suffix	
	88%	

	Received Back Suffix	
back, i	81%	
back, í	66%	
back, ē	59%	
back, e	27%	

	Received Front Suffix
neutral, i	77%
neutral, í	80%
neutral, é	84%
neutral, e	85%

Patterns:

In all of the controlled questions, only one survey entry came back with one hundred percent of the subjects responding (*celrünek*), but even the other two *celrü* entries came back with some subjects choosing the back vowel suffix, showing both that subjects do not always respond to the same words in the same ways, and that even the so-called controlled entries did not prove as straight-forward as expected.

To compare the results I expected and the actual results, I will again be referring to the chart of the existing words in Hungarian and the patterns in which they govern suffixes, repeated here for ease of reference.

penultimate V	final V	back vowel chosen (neutral vowels completely transparent)	vacillating suffixes	disharmonic vowel chosen (front vowel)
back	i, í	papír-nak		
back	é	rostély-nak	konkrét-nak/nek	
back	e	haver-nak	dzungel-nak/nek	kódex-nek
neutral	i, í		analízis-nak/nek	
neutral	é		matiné-nak/nek	
neutral	i, í			oxigén-nek
neutral	e			november-nek

The chart predicts that 100% of the back vowel, *i*, *í* combinations will result in a back vowel suffix, but only an average of 73% of the new Hungarian words with this vowel pattern were given a back vowel suffix by the subjects. The chart also predicts that 100% of the neutral vowel, *e* combinations will result in a front vowel, and 85% of the survey words of this type were given a front vowel in the suffix. Also, when the neutral vowel in this pattern was *i* or *í*, the correct suffix only occurred 77% of the time, but when the neutral vowel was *e* or *é*, we get a 94% success rate, which rivals the success rate of the controls.

The pattern of neutral vowel followed by *i* or *í* has only a vacillating option. The survey's results averaged 78% front vowel suffix though, indicating a preference for the front vowel option. This possibly strengthens my position in the OT analysis that the exception is the back vowel alternation, and that without specific morphological changes, words of this type govern front vowel suffixes. Also, a neutral vowel followed by *é* has an average of 84% front vowel suffix occurrence, giving merit to my OT constraints. Because the rest of the chart has more than one type of ending possibility for each vowel pattern, it is not possible to compare the survey results to the chart since we do not know what percentage of words belong in each category, as that is assigned by the lexicon and could not be predicted.

<u>VIII. Conclusion</u>

Throughout the development of my generative grammar and optimality constraints, I have found myself needing to rely on the morphology to explain the complex Hungarian data. After researching, I know that there is vast understanding among linguists who study Hungarian Vowel Harmony, and that the phonological explanations are simply not complete enough. There is a lot of evidence to support the assertion that Hungarian Vowel Harmony is not a phonetically robust system. First there is the finding that environment can affect the suffix choice when the word is vacillating. Possibly vacillations even originated to please morphological preferences. Second are Kontra and Ringen's (1986) findings that loan words suffixation process may be affected by stress, which is different behavior than native words, which is a lexical distinction. And third, my own data suggest that suffixation processes are not only dependent on phonological systems. Harrison and Kaun (1999) state that as more disharmonic loan words enter a language, the vowel harmony patterns become less reliable, and I am convinced that this is the case in Hungarian. My final analysis of Hungarian Vowel Harmony is that it is becoming less of a phonological process and more morphological as the language changes and acquires more loan words. Although it may have began as a completely phonological process, it certainly is not anymore.

23

Name: _____

Age: _____

This is a linguistics experiment. The following list of words are new words in Hungarian, the meanings of which are not important. It is your job to circle the best-sounding suffix choice for each word. Please do not worry about what is proper, just choose the form that sounds best to you.

Example:

dornát	(dornátnak)	dornátnek
pösöt	(pösötböl)	pösötböl
rabúna	rabúnanél	(rabúnanál)

goszoli	goszolinak	goszolinek
molcsagy	molcsagynél	molcsagynál
rábalit	rábalitnál	rábalitnél
cinbé	cinbéböl	cinbéböl
filgyi	filgyinál	filgyinél
alkímib	alkímibböl	alkímibböl
zsúmi	zsúmiböl	zsúmiböl
lásdabev	lásdabevnek	lásdabevnak
celrű	celrűböl	celrűböl
zúlpési	zúlpésinek	zúlpésinak
pulé	pulénak	pulének
gafir	gafirnek	gafirnak
vogyle	vogyleböl	vogyleböl
póbáste	póbásteböl	póbásteböl
múndrín	múndrínak	múndrínek
hopzástad	hopzástadnál	hopzástadnél
goszoli	goszoliböl	goszoliböl
remkin	remkinnak	remkinnek
sanyámi	sanyáminek	sanyáminak
dambízséb	dambízsébböl	dambízsébböl
filgyi	filgyiböl	filgyiböl
dafíz	dafíznak	dafíznek
nyúmla	nyúmlaból	nyúmlaból
údkemec	údkemecböl	údkemecböl

1

bovútib	bovútibnek	bovútibnak
múndri	múndrínál	múndrínél
bovútib	bovútibnél	bovútibnál
gafir	gafirból	gafirből
táltor	táltornek	táltornak
pulé	pulénál	pulénél
botnázsré	botnázsrének	botnázsrénak
szösödöm	szösödömből	szösödömből
divcsín	divcsínból	divcsínból
csuhovész	csuhovésznak	csuhovésznek
nyédéz	nyédéznak	nyédézneknál
pordenté	pordenténél	pordenténál
múvén	múvénnek	múvénnak
vogyle	vogylenál	vogylenél
póbáste	póbástenek	póbástenak
búlsú	búlsúnak	búlsúnek
szufkem	szufkemnak	szufkemnek
gyinte	gyintenél	gyintenél
boszlanát	boszlanátból	boszlanátból
rábalit	rábalitnak	rábalitnek
lásdabev	lásdabevből	lásdabevből
pérken	pérkenből	pérkenből
fílgyi	fílgyinak	fílgyinek
zsúmi	zsúminál	zsúminál
molcsagy	molcsagynek	molcsagynak
álbimzsid	álbimzsidnek	álbimzsidnak
hónsíre	hónsíreből	hónsíreből
sovénfi	sovénfiből	sovénfiből
búlsú	búlsúból	búlsúból
tyeszí	tyesziből	tyesziből
goszoli	goszolinál	goszolinél
remkin	remkinnál	remkinnél
sovénfi	sovénfinek	sovénfinak
sanyámi	sanyámiból	sanyámiból
botnázsré	botnázsrénél	botnázsrénál

dafíz	dafízből	dafízből
tyeszí	tyeszínak	tyeszíneknál
rábalit	rábalitból	rábalitból
tyeszí	tyeszínál	tyeszínél
dambízséb	dambízsébnél	dambízsébnál
zülpési	zülpésiből	zülpésiből
divcsín	divcsínnak	divcsínneknál
hüklöke	hüklökenél	hüklökenál
dintyürr	dintyürből	dintyürből
táltor	táltorból	táltorból
alkímíb	alkímíbnél	alkímíbnál
nyédéz	nyédézből	nyédézből
pordenté	pordenténe	pordenténak
csuhovész	csuhovészből	csuhovészből
celrü	celrűnak	celrűnek
boszlanát	boszlanátnál	boszlanátnél
nyúmla	nyúmlanek	nyúmlanek
cinbé	cinbénak	cinbének
remkin	remkinből	remkinből
zsúmi	zsúminek	zsúminak
sovénfi	sovénfinél	sovénfinál
dambízséb	dambízsébnek	dambízsébnek
hopzástad	hopzástadból	hopzástadból
művén	művénnél	művénnál
bovútib	bovútibból	bovútibból
gyinte	gyintenak	gyintenek
álbimzsid	álbimzsidnél	álbimzsidnál
pérken	pérkennek	pérkennak
hónsíre	hónsírenak	hónsírenek
dafíz	dafíznál	dafíznél
údkemec	údkemecnek	údkemecnak
pulé	puléból	puléból
vogyle	vogylenak	vogylenek
zülpési	zülpésinél	zülpésinál
bűlsű	bűlsűnál	bűlsűnél

3

dintyür	dintyürnek	dintyürnak
szösödöm	szösödömnak	szösödömnek
szufkem	szufkemnál	szufkemnél
müvén	müvénből	müvénből
hüklöke	hüklökenek	hüklökenak
póbáste	póbástenél	póbástenál
szufkem	szufkemből	szufkemből
celrü	celrünál	celrünél
cinbé	cinbénál	cinbénél
álbimzsid	álbimzsidból	álbimzsidből
táltor	táltornél	táltornál
boszlanát	boszlanátnak	boszlanátnek
lásdabev	lásdabevnél	lásdabevnál
csuhovész	csuhovésznál	csuhovésznél
gafir	gafirnél	gafirnál
sanyámi	sanyáminél	sanyáminál
nyúmla	nyúmlanél	nyúmlanál
hopzástad	hopzástadnak	hopzástadnek
údkemec	údkemecnél	údkemecnál
pordenté	pordentéből	pordentéből
dintyür	dintyürnél	dintyürnál
pérken	pérkennél	pérkennál
divcsín	divcsínnál	divcsínnél
hüklöke	hüklökeből	hüklökeből
múndrí	múndriből	múndriből
hónsíre	hónsírenél	hónsírenél
molcsagy	molcsagyból	molcsagyból
alkímib	alkímibnek	alkímibnak
nyédéz	nyédéznál	nyédéznél
gyinte	gyinteből	gyinteből
botnázsré	botnázsréből	botnázsréből

APPENDIX B

<u>Controls</u>

Front Roots	Received Front Suffix
bűlsű	94%
dintyűr	95%
szösödöm	95%
hüklöke	91%
celrű	97%

Back Roots	Received Back Suffix
táltor	89%
boszlanát	90%
nyúmla	82%
hopzástad	85%
molcsagy	93%

Back Harmonic, I	Received Back Suffix
zsúmi	82%
gafir	76%
goszoli	86%
rábalit	79%

Back Harmonic, Í	Received Back Suffix
múndrí	68%
dafíz	71%
sanyámí	72%
bovútíb	53%

Back Harmonic, É	Received Back Suffix
pulé	76%
múvén	43%
botnázré	49%
csuhovész	38%

Back Harmonic, E	Received Back Suffix
vogyle	44%
szufkem	20%
póbáste	32%
lásdabev	13%

Neutral Vowel, I	Received Front Suffix
fílgyi	87%
remkín	88%
sovénfi	65%
álbimzsid	67%

Neutral Vowel, Í	Received Front Suffix
tyeszí	88%
divcsín	76%
zűlpésí	83%
alkímíb	71%

Neutral Vowel, É	Received Front Suffix
cinbé	93%
nyédéz	88%
pordenté	80%
dambízséb	73%

Neutral Vowel, E	Received Front Suffix
gyinte	78%
pérken	92%
hónsíre	76%
údkemec	95%

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